WE CLAIM:

1. A magneto-optic modulator comprising:

an optical waveguide comprising a magneto-optic active medium;

a biasing magnetic field generator adapted to apply a biasing magnetic field in said magneto-optic active medium; and

a magnetization modulator adapted to modulate a magnetization of the magneto-optic active medium;

whereby during operation of the biasing magnetic field generator, the magnetization modulator causes modulation of an optical signal passing though the optical waveguide.

2. A magneto-optic modulator according to claim 1 wherein:

during operation of the biasing magnetic field generator the optical signal propagates through the optical waveguide in a first direction; and

the biasing magnetic field generated by the biasing magnetic field generator is oriented in a second direction and has a significant component perpendicular to the first direction.

3. A magneto-optic modulator according to claim 2 wherein:

the magnetization modulator comprises a conducting microstrip line oriented in a third direction adapted to generate in the magneto-optic active medium a magnetic field having a significant component parallel to the first direction

for modulating the magnetization of the magneto-optic medium when current is passed through said conducting microstrip line;

whereby passing a current signal though said conducting microstip line during operation of the biasing magnetic field generator modulates the optical signal passing though the magneto-optic active medium.

4. A magneto-optic modulator according to claim 1 wherein the magneto-optic active medium comprises a rare earth element substituted Iron Garnet.

5. A magneto-optic modulator according to claim 1 wherein the magneto-optic active medium comprises Bismith substituted Yttrium Iron Garnet (Bi-YIG).

6. A magneto-optic modulator according to claim 1 wherein the biasing magnetic field generator is adapted to apply a biasing magnetic field such that the magneto-optic modulator operates in a non-resonant state.

7. A magneto-optic modulator according to claim 1 wherein the biasing magnetic field generator is adapted to apply a biasing magnetic field such that the magneto-optic modulator operates in a resonant state.

8. A magneto-optic modulator according to claim 1 wherein the biasing magnetic field generator is adapted to apply a biasing magnetic field having a magnetic field strength such that a signal modulation caused by the magnetization modulator has a Fourier spectrum whose DC to 3-dB point frequencies lie in a relatively flat region of a frequency-amplitude curve of the magneto-optic modulator below a ferromagnetic resonance frequency of the magneto-optic

modulator, whereby the magneto-optic modulator operates in a non-resonant state.

9. A magneto-optic modulator according to claim 1 wherein the biasing magnetic field generator is adapted to apply a biasing magnetic field having a magnetic field strength such that a signal modulation caused by the magnetization modulator has a Fourier spectrum whose peak frequencies lie in a peaked region of a frequency-amplitude curve of the magneto-optic modulator substantially at a ferromagnetic resonance frequency of the magneto-optic modulator, whereby the magneto-optic modulator operates in a resonant state.

10. A magneto-optic modulator according to claim 3 wherein the first direction and the second direction are substantially perpendicular to each other, and wherein the second direction and the third direction are substantially parallel to each other.

11. A magneto-optic modulator according to claim 2 wherein the magneto-optic active medium comprises a thin film oriented in a plane defined by the first and second directions.

12. A magneto-optic modulator according to claim 2 further comprising a cladding layer in contact with the magneto-optic active medium, wherein the conducting microstrip line is in contact with the cladding layer.

13. A magneto-optic modulator according to claim 2 wherein the conducting microstrip line is in direct contact with the magneto-optic active medium.

14. A magneto-optic modulator according to claim 1 wherein the biasing magnetic field is such that it causes a

homogeneous static magnetization saturation in the magneto-optic active medium.

15. A magneto-optic modulator according to claim 1 wherein the magneto-optic active medium is such that when magnetized it causes a Faraday rotation of polarization states of optical signals propagating through the magneto-optic active medium in a direction non-perpendicular to a direction of magnetization of the magneto-optic active medium.

16. A magneto-optic modulator according to claim 1 further comprising a polarization analyzer for generating an intensity modulated optical signal.

17. A method of magneto-optic modulation of an optical signal propagating through a magneto-optic active medium, the method comprising:

generating in the magneto-optic active medium a biasing magnetic field to generate a magnetization of the magneto-optic active medium; and

generating in the magneto-optic active medium a magnetic field adapted to modulate the magnetization of the magneto-optic medium.

18. A method of magneto-optic modulation of an optical signal propagating in a first direction through a magneto-optic active medium, the method comprising:

generating in the magneto-optic active medium a biasing magnetic field in a second direction having a significant component perpendicular to the first direction; and

generating in the magneto-optic active medium a magnetic field in a third direction having a significant

component parallel to the first direction for modulating a magnetization of the magneto-optic medium.

19. A method of magneto-optic modulation according to claim 17 wherein the magneto-optic active medium comprises a rare earth element substituted Iron Garnet.

20. A method of magneto-optic modulation according to claim 17 wherein the magneto-optic active medium comprises Bismith substituted Yttrium Iron Garnet (Bi-YIG).

21. A method of magneto-optic modulation according to claim 17 wherein the biasing magnetic field is such that the step of generating in the magneto-optic active medium a magnetic field adapted to modulate the magnetization of the magneto-optic medium causes a non-resonant state in the magneto-optic medium.

22. A method of magneto-optic modulation according to claim 17 wherein the biasing magnetic field is such that generating in the magneto-optic active medium a magnetic field adapted to modulate the magnetization of the magneto-optic medium causes a resonant state in the magneto-optic medium.

23. A method of magneto-optic modulation according to claim 17 wherein the biasing magnetic field has a magnetic field strength such that generating in the magneto-optic active medium a magnetic field adapted to modulate the magnetization of the magneto-optic medium causes an optical signal modulation having a Fourier spectrum whose DC to 3-dB point frequencies lie in a relatively flat region of a frequency-amplitude curve of below a ferromagnetic resonance frequency of the magneto-optic active medium, whereby the magneto-optic medium exhibits a non-resonant state.

24. A method of magneto-optic modulation according to claim 17 wherein the biasing magnetic field has a magnetic field strength such that generating in the magneto-optic active medium a magnetic field adapted to modulate the magnetization of the magneto-optic medium causes an optical signal modulation having a Fourier spectrum whose peak frequencies lie in a peaked region of a frequency-amplitude curve substantially at a ferromagnetic resonance frequency of the magneto-optic active medium, whereby the magneto-optic medium exhibits a resonant state.

25. A method of magneto-optic modulation according to claim 18 wherein the first direction and the second direction are substantially perpendicular to each other, and wherein the second direction and the third direction are substantially parallel to each other.

26. A method of magneto-optic modulation according to claim 18 wherein the magneto-optic active medium comprises a thin film oriented in a plane defined by the first and second directions.

27. A method of magneto-optic modulation according to claim 17 wherein the biasing magnetic field is such that it causes a homogeneous static magnetization saturation in the magneto-optic active medium.

28. A method of magneto-optic modulation according to claim 17 wherein the magneto-optic active medium is such that when magnetized it causes a Faraday rotation of polarization states of optical signals propagating through the magneto-optic active medium in a direction non-perpendicular to a direction of magnetization of the magneto-optic active medium.

29. A method of magneto-optic modulation according to claim 17 further comprising passing the optical signal through a polarization analyzer after it has passed through the magneto-optic active medium for generating an intensity modulated optical signal.

30. A media for magneto-optic modulation comprising:

a magneto-optic active medium for magneto-optic modulation of an optical signal passing therethrough; and

a conducting medium located proximate to the magneto-optic active medium and adapted to generate a magnetic field for modulating a magnetization of the magneto-optic medium when a current is passed through said conducting medium.

31. A media according to claim 30 wherein the magneto-optic active medium comprises a layer of magneto-optic active material.

32. A media according to claim 31 wherein the conducting medium comprises a layer of conducting material having a surface substantially parallel to a surface of the layer of magneto-optic active material, said surface of the layer of conducting material and said surface of the layer of magneto-optic active material facing each other and being proximate to each other.

33. A media according to claim 32 wherein the surface of the layer of conducting material and the surface of the layer of magneto-optic material are affixed to each other.

34. A media according to claim 31 wherein the surface of the layer of conducting material and the surface of the layer

of magneto-optic material are spaced apart by a cladding layer situated therebetween.